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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/493,104	01/28/2000	Ken Yoshioka	503.38156X00	1799

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EXAMINER	
OLSEN, ALLAN W	
ART UNIT	PAPER NUMBER
1746	6

DATE MAILED: 05/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

MF-4

Office Action Summary	Application No.	Applicant(s)	
	09/493,104	YOSHIOKA ET AL.	
	Examin r	Art Unit	
	Allan W. Olsen	1746	

-- The MAILING DATE f this communication appears on the cover sheet with the correspondence address --

Period f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8 and 12-23* is/are pending in the application.

4a) Of the above claim(s) *12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-8 13-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 January 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

Applicant's election of group I, claims 1-8 and 12-23, and Applicant's cancellation of the group II claims, 9-11, in Paper No. 5 is acknowledged. Within group I, Applicant elected the specie that was characterized as a method of etching a lamination layer wherein the lamination layer to be etched comprised an upper pole. Claims 1-8 and 13-23 were indicated as belonging to the elected specie. However, claim 12 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected specie, there being no allowable generic or linking claim. Election was made without traverse in Paper No. 5.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because:

reference characters "7 " and "4" have both been used to designate the unload lock chamber;

reference characters "1" and "11" have both been used to designate the etching chamber;

reference character "7" has been used to designate both the unload lock chamber and the atmospheric loader;

reference character "1" has been used to designate both the etching chamber and the etching process unit.

Also, in:
figure 9:

step S13 - "EACHING" should be --ETCHING--;

in S12 "41" should be --51--;

in D12, D13 and D14 the seed layer 44 lacks the clear demarcation that it is given in figures D15 and D16;

in D14 layer 44 is not shown or labeled;

in D15 layer 44 is shown but not labeled;

the distinguishing speckle pattern of 47 should be maintained in D15 and D16;

in D16, the reference number 47 is pointing to what is actually 44 and 44 is pointing to what is actually 50.

figure 10 - "MELECULES" and "INMEDIATELY" are incorrect;

figure 12 – "BEFOR", "NECESSSIATED" and "SELECTIMITY" are incorrect.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 3 and 20 are objected to because of the following informalities:

claim 3 – "BCl_2" should be --BCl_3--;

claim 20, step 4 - "gas" should be --gap--.

The examiner notes that claim 17, as filed, is dependent upon claim 18. Did Applicant intend claim 17 to be dependent upon claim 16?

Appropriate correction or clarification is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 4 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Claim 4 requires the use of "fluorine nitric acid",

however, "fluorine nitric acid is, at least to this examiner, an unknown compound. Therefore, a method of obtaining or at very least a definition of "fluorine nitric acid" is considered to be critical or essential in order to the practice the invention. However, the specification nor the claims disclose such a method or definition. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2, 13-16, 18, and 20-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2 and 20-22 requires that one ore more process step be carried out "continuously". In claim 2, for example, a continuous rinsing as is claimed would not allow the required drying of the third step to ever take place.

Claims 13-16 and 18 recite that two particular layers be in "close contact". Does being in close contact differ from being in contact?

Claim 14 recites that two particular layers are connected. Does this mean in contact with each other or may there be a bridging layer serving as the connector?

Claims 13 and 20 are rendered indefinite by the phrase "such as" in claim 13 and the phrase "or the like" in each of claims 13 and 20 because the claims include elements not actually disclosed (those encompassed by "or the like"), thereby rendering the scope of the claims unascertainable. See MPEP § 2173.05(d).

Claims 21 recites the limitation "carrying out the plasma etching **steps 1-5**..." (emphasis added). Because claim 21 is dependent upon claim 19, rather than claim 20 wherein steps 1-5 are recited, there is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claim 19 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,069,035 issued to O'Donnell et al. (hereinafter, O'Donnell).

O'Donnell teaches a method of etching a metal layer, such as the NiFe alloy used in the fabrication of read/write magnetic heads. O'Donnell teaches plasma etching of a metal layer that is disposed beneath an etching mask, for example a photoresist or a hard mask. After the plasma etching, O'Donnell teaches rinsing the substrate to remove residual material, which if not removed would lead to corrosion of the metallic layer. See: column 1; column 2, lines 58-64; column 4, lines 38-40.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Donnell.

O'Donnell teaches a method of etching a layer comprising a transition metal, such as PERMALLOY™. O'Donnell's uses a plasma containing chlorine and argon to etch the metal layer while the temperature of the substrate support is maintained at 40°C. Following the chlorine etch step O'Donnell teaches a second step of rinsing the substrate with 90° C deionized water in order to remove chlorine residue from the etched substrate. O'Donnell teaches that the metal layer may be patterned by etching through a patterned photoresist mask. See: column 1, lines 10-20, 30-35, 62-65; column 5, 21-25; column 6, lines 34-35; column 5, line 66 – column 7, line 34.

O'Donnell does not teach the step of drying the substrate after it has been rinsed with water.

It would have been obvious to one skilled in the art to dry the substrate because the presence of water would hinder, if not prevent, additional processing steps or the actual use of the fabricated device in an end product. Alternatively, unless the rinsing step of O'Donnell never ceases, the instantly claimed drying step is considered as an inherent aspect of O'Donnell's process because the O'Donnell's substrate would eventually become dry.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over O'Donnell as applied to claim 1 above, and further in view of U.S. Patent 5,520,716 issued to Takagi et al. (hereinafter, Takagi).

Claim 8 is dependent upon claim 1. O'Donnell teaches the limitations of claim 1 as noted in the above rejection. Additionally, it is noted that O'Donnell teaches that the method finds utility in the fabrication of magnetic heads. See column 1, lines 19-22 and column 7, lines 28-32.

O'Donnell does not teach that the PERMALLOY^{TM} layer being etched is on a sintered Al_2O_3/TiC substrate.

Takagi teaches a sintered Al_2O_3/TiC substrate for magnetic heads.

It would have been obvious to one skilled in the art to use a sintered Al_2O_3/TiC substrate when applying O'Donnell's method to the fabrication of a magnetic head because the sintered Al_2O_3/TiC substrate of Takagi the fabrication of magnetic heads that have excellent smoothness. Also the head may be manufactured with high precision thereby proving heads with improved reliability.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,282,776 issued to Otsuka et al. (hereinafter, Otsuka) in view of O'Donnell.

Otsuka teaches a method of fabricating a magnetic head comprising each of the component layers recited in the instant claims (i.e. an upper pole made from an a NiFe alloy, a seed layer, a gap layer and a NiFe alloy lower pole/shield layer). Otsuka's method includes etching the seed layer and then plasma etching the gap layer with a Cl or F containing gas. See column 15, line 61 - column 16, line 21.

Otsuka does not teach removing chlorine or fluorine residue with a liquid rinse.

O'Donnell teaches removing chlorine or fluorine residue with a liquid rinse.

It would have been obvious to one skilled in the art to removing chlorine or fluorine residue from the structure of Otsuka by applying a liquid rinse as taught by O'Donnell because O'Donnell teaches that corrosion is prevented by removing the chlorine and fluorine residues with a liquid rinse.

Claims 13, 15-18, 20, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka in view of O'Donnell and further in view of U.S. Patent 5,607,599 issued to Ichihara et al. (hereinafter, Ichihara).

Otsuka teaches a method of fabricating a magnetic head comprising each of the component layers recited in the instant claims (i.e. an upper pole made from an a NiFe alloy, a seed layer, a gap layer and a NiFe alloy lower pole/shield layer). Otsuka's method includes etching the seed layer and then plasma etching an oxide gap layer with a Cl or F containing gas. See column 15, line 61 - column 16, line 21.

Otsuka does not teach removing chlorine or fluorine residue with a liquid rinse.

O'Donnell teaches removing chlorine or fluorine residue with a liquid rinse.

It would have been obvious to one skilled in the art to removing chlorine or fluorine residue from the structure of Otsuka by applying a liquid rinse as taught by O'Donnell because O'Donnell teaches that corrosion is prevented by removing the chlorine and fluorine residues with a liquid rinse.

Otsuka does not teach plasma etching the seed or shield layers with argon and chlorine.

Ichihara teaches etching NiFe alloy layers such as seed and shield layers with an argon and chlorine plasma. See column 4, lines 27-48

It would have been obvious to one skilled in the art to use the plasma etching method of Ichihara because Ichihara teaches that the use of Ar and BCl3 allows one to obtain a high degree of etching selectivity between the various layers of the magnetic head as well as providing a means of fabricating the a magnetic head while maintaining a low processing temperature.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Each reference cited on the attached PTO form 892 pertains to either the plasma etching of magnetic head structures or the etching of a specific material that is a component of the claimed magnetic head.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is (703) 306-9075. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached on (703) 308-4333. The fax phone number for this Group is (703) 305-7719.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Allan Olsen, Ph.D.
April 27, 2002

Allan Olsen
Examiner Art Unit 1745